Lesson Plans

From

Oyster Habitat Workshop

Presented by

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From

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D'Algae

(Does all light give algae energy?)

Grade Level: 6 (Field Activity – trip to a dock on a saltwater creek)

Objectives (*TSWBAT):* use plankton nets, they made, to collect algae samples.

Materials: student made plankton nets
4 10-gallon aquariums (or large glass/plastic jars)
Kit for measuring dissolved oxygen
Sterilized 2 or 3 liter bottles (to hold samples)
(2 or 3 per group)
Funnels (1 per group)
Rubber Gloves (1 pair per group)

Time Frame: 1 day

Student Groups: groups of 3 to 5 (maximum – 30 students) with one chaperone per 10 students (preferably one per group)

Key Terms: algae, plankton, phytoplankton, zooplankton, controlled variables, water quality

(Linda Edwards & Susan Miller)

Background Information for teacher:

Before the day of the field trip, discuss:

- plankton and how they are moved mainly by water currents
- tides
- the presence or absence of certain species of algae as an indicator of water quality
- the role of algae in the food chain (especially in relation to oysters)
- the effect of temperature on algae
- equipment used to take samples
- sampling techniques

Procedures: 1) Each group should take their plankton net, toss it into the creek, and pull along the dock towards the shore.

2) They should carefully pour their sample into the 2-liter bottle, using the funnel to avoid spills. (Use rubber gloves to avoid contaminating the sample.)
3) Each group should repeat steps 1 & 2 until they have each of their 2-liter bottles about 1/3 full. (Be sure to screw the bottle caps firmly in place.)
4) Groups should then collect one more sample and use kits to test this last sample for dissolved oxygen. Record this data.
5) After returning to the class, students will pour their samples into the aquariums. (Each aquarium will be set up under the same conditions. The only difference among them will be the type of light shining on the aquarium. One aquarium will not have any extra light source. This will be the control.)
6) The teams will share the results of the dissolved oxygen tests that were performed in the field. The class will discuss their predictions of what the oxygen levels will be in each of the aquariums.

(Linda Edwards & Susan Miller)

Relevance to students: Sampling techniques and making the equipment needed to take samples covers standards that students need to know in order to pass PACT.

It is also important to learn about algae's place in the food chain. This can help them infer why we should take care of our coastal waters.

Assessment: Students will write up the experiment we will be doing in class on algae using the scientific method.

Adaptations: If a field trip is not possible, the teacher could secure the samples instead.

If a school will not permit the field trip, perhaps the students, their families, and the teacher could do this activity on a weekend.

Resources: Anderson, Norman D. and Stubbs, Harriet S. 2000. Algae: A Sourcebook for Teaching About Harmful Algal Blooms. Iowa: Kendall/Hunt Publishing Company.

Cross-Curricular Connections: English/Language Arts (writing)
Math (recording data)

S.C. Curriculum Standards: Inquiry Skills

(Linda Edwards & Susan Miller)

D'Algae

(Does all light give algae energy?)

Grade Level: 6 (Classroom Activity)

Objectives (*TSWBAT):* 1) use an oxygen kit to measure dissolved oxygen levels in algae samples
2) record data from oxygen tests
3) graph data
4) infer that dissolved oxygen levels are affected by the growth of algae

Question: Does all light give algae energy?

Materials: 4 10-gallon aquariums (or large glass/plastic jars -- containing the algae samples from the field trip)
4 turkey basters
Kit for measuring dissolved oxygen
Overhead projector
Beakers or clear plastic cups (1 per group)
Team data tables (1 per team)
Class data tables (1 per student)
Rainwater, pond water, or spring water

- Fertilizer 4-10-4 or 5-10-5 (1 gram per 1 liter of pond, spring, or rainwater)-- used to replace water that evaporates in the aquariums
- (kept in sterilized 2 or 3 liter bottles)

Time Frame: about 20 minutes per day, 3 days per week, for 3 weeks

Seating Arrangement: groups of 3 to 5 (maximum – 30 students)

(Linda Edwards & Susan Miller)

Key Terms: algae, oxygen, photosynthesis

Background Information for teacher:

- You might want to start collecting rainwater in advance of this activity if it is the type of water you plan to use.
- No matter which water you choose to use, it will need to be boiled for at least 20 minutes to further sterilize it. Do this in advance so that it will already be stored at room temperature.
- *Anytime you come in contact with the algae, you should use sterilized equipment.*
- It might also be a good idea to stir the algae mixture before removing your sample for each test so that you don't inadvertently get a concentrated sample from the aquarium. (Be sure to review photosynthesis with students and have them make inferences concerning algae, photosynthesis, and dissolved oxygen.)

Procedures: 1) Each group should take their sterilized turkey baster and collect a sample of 50 ml of water from their assigned aquarium.

2) Groups should use kits to test their samples for dissolved oxygen.

3) Results of each team's oxygen test should be recorded on their data table.

4) Each group should share with the class the results of their oxygen test so that everyone can record the data for each team on their class data table. (Teacher can also record this on a transparency of the class data table.) Class discussions should follow.

5) Steps 1 – 4 should be repeated 3 times per week for three weeks.

6) At the end of three weeks, the class can use data they have recorded on their class data tables and make a graph.

7) Using their graphs, students should write conclusions on how different lights affected the growth of algae.

(Linda Edwards and Susan Miller)

Relevance to students: Oysters are an important part of our economy and culture. Since oysters eat algae, it is important to learn about algae.

Testing the different kinds of light might show a more efficient way to grow algae in a lab to provide food for the oysters being studied there.

Assessment: 1) Students will make conclusions about the direct effect of light on algae and the indirect effect on oysters. (This will be based on the amount of dissolved oxygen found in samples of algae.)
2) Students will write up a summary of this lab activity in their journals.

Adaptations: If equipment was limited, this activity could be done as a teacher demonstration.

It could also be done with just one group doing the tests each day you tested, instead of 7 to 10 groups testing each time.

It could be done with three different teachers. Each class being responsible for one aquarium, sharing their data with students in other classes.

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Cross-Curricular Connections: English/Language Arts (writing)
Math (recording and graphing data)

S.C. Curriculum Standards: Inquiry Skills

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